European Trade Union
Technical Bureau
for Health and Safety

The European trade union movement and sustainable development ahead of the Earth Summit – a European strategy for quality employment and the protection of the environment

ETUC Conference

Seville, 16-18 June 2002

Thematic Workshop n°1

Climate change and energy

Introductory paper

by UGT and CC.OO, Spain

CLIMATE CHANGE AND CLEAN ENERGY FOR SUSTAINABLE EMPLOYMENT

CONTENTS

PREAMBLE

As a resource, energy is basic to social and economic development, but its use and transformation have caused significant environmental problems, ranging from urban pollution to acid rain and marine pollution. The most serious problem is climate change resulting from emissions of greenhouse gases, whose main human-derived source is the use of fossil fuels. Throughout this century, therefore, energy is destined to play a central role in sustainable development policies.

The goal of achieving the necessary energy while at the same time preventing adverse environmental impact requires a profound change in the energy model of the European Union and the world's most developed countries - the largest consumers - but also in less industrialised countries which need to increase energy use to develop.

Clearly the trend is towards increased demand for energy, especially in developing countries. This legitimate demand requires and will continue to require us to consider the need to protect our environment, which has already suffered considerable alteration as a result of irrational exploitation and usage of energy. There are various dimensions to the change towards a sustainable model: technological, economic, institutional, social and environmental. From now on we must think in terms of "heritage management" of energy sources, taking into account different factors, such as the limited nature of resources, environmental protection and equal access to energy and employment for different countries and individuals.

The limited resources require that we commit ourselves to using energy rationally, with criteria of saving and efficiency; to developing renewable energy sources and to pursuing large scale technological innovation. The efforts made over the next ten years must be targeted at a more efficient use of energy resources.

Protection of the environment has become a primary obligation to counter the hazards of energy production and consumption - air pollution, worsening of the greenhouse effect, deforestation and degradation of natural areas. The European Union must bring about some basic changes, geared towards breaking the link between economic growth and the environmental pressure of use of natural and energy resources, in order to prevent such growth from leading to further environmental degradation.

Furthermore, given Europe's technological capacity and the fact that its has a more efficient production model than the US (which consumes only 70% of the energy it produces), it can and must lead the way in creating an energy model different to the traditional one. Ratification of the Kyoto Protocol, which commits the European Union to reducing its emissions of greenhouse gases, is a positive sign, and contrasts with the United States' refusal to accept similar commitments.

Equality between countries requires guaranteeing the right to energy - as vital a resource as water for satisfying the needs of the populations of developing countries. Access to the energy for the most underprivileged members of the world community requires co-operation and an exchange of knowledge and technologies. From this perspective, we must seek to help these countries to develop their own energy models. These models, founded

on moderation and diversity, must be adapted - technically, economically, socially and environmentally - to the countries' own needs.

The availability and structure of employment is also affected by energy-related questions. Availability of or dependency on energy resources, energy costs, the energy efficiency of the production system; all these factors have a powerful influence on employment and will continue to do so in the future. An unsustainable energy model results in unsustainable employment. Similarly, the use of one or other energy source and its future development will also be decisive in determining the number and type of jobs available and future trends in this regards. The development of renewable energy and energy efficiency programmes is creating significant numbers of new jobs, which will require adaptation and training of the workers involved. But reductions in traditional energy sources also create employment problems which must be tackled with the necessary mechanisms of fair transition to mitigate adverse and undesirable social effects.

The deregulation of energy markets must guarantee that energy supply remains a public and universal service and that all consumers have to right to access it. It must also be founded on a diversification of supply, in terms of sustainable development and creation of employment.

CHARACTERISTICS OF THE EUROPEAN ENERGY MODEL

The European energy system is predominantly based on the use of oil, which accounts for nearly half of all primary energy consumption. Use of coal is being progressively phased out as natural gas is gradually introduced. These three fossil fuels represent rather more than three quarters of the energy supply. Nuclear energy plays a significant part in electricity generation in some countries, while the use of renewable energy sources is advancing hesitantly.

The European Union is highly dependent on external sources for its energy supply: half of total demand is met with fuel from non-EU countries.

Historically **coal** was the “European” fuel, but its use is declining, partly as a result of difficulties in mining the fields, partly for environmental reasons, and current forecasts point to a gradual abandonment of this energy source. It is used basically to generate electricity (where it will be replaced by natural gas) and in the iron and steel industry.

Oil (or petroleum), the most widely used energy resource in the world, is a fuel with a high level of greenhouse gas emission: specific emissions are similar to those for coal. However, although it should be gradually phased out for this reason, it is not yet clear how this is to be achieved. The ever-growing transport industry, which forms a captive market, is today one of the most important factors in long-term oil consumption and CO2 emission levels. Petroleum and petroleum derivatives are the most easily accessible fuels for any country — they can be marketed at different scales of demand and are versatile in their uses. As a result, world demand is growing, with a heavy impact on climate change.

Natural gas has the lowest CO2 emission rates of any fossil fuel. It is currently replacing coal and oil in the domestic, services and industrial sectors, a desirable situation in the transition towards cleaner energy use. It has now broken—strongly, but somewhat

irregularly—into the area of electricity generation. Natural gas is currently considered to have a promising future, in view of its moderate price and flexibility of use for generating electricity and for individual heating needs. It may be envisaged that in the future there will be a move towards use of natural gas in transport, with a beneficial reduction in pollution and CO2 emissions. All of these developments will lead to a considerable increase in demand, and we must therefore be aware of the question of "security of supply", especially in view of the fact that natural gas is transported through pipelines or in the form of liquefied gas, with little flexibility in the event of changes in the countries of origin.

Nuclear energy, which was given new impetus in the 1970s as a result of the oil crisis, and was adopted in some countries as a means of providing an important proportion of power demands, is now in progressive decline. Attempts to present it as an alternative to combat climate change have not prospered, due to the high economic costs and environmental hazards. Various European countries have decided to abandon its use progressively.

Renewable energy sources

The oil crisis of the 1970s gave fresh incentive to the work of promoting renewable energy. Research began into solar energy and other alternatives, while at the same time policies were established to support its introduction. Since the beginning of the twentieth century, hydro-electric power had played an important part in electricity supply.

The European Union has set a target of meeting 12% of primary energy demand through renewable energy sources by around 2010. In specific terms, the target is to achieve 24% of electricity generation with this type of energy—including hydroelectric power—and that 5% of automobile fuels should be bio-fuels.

There is scope for more progress in renewable energy in the EU. According to reports such as TERES, commissioned by the European Commission, renewable energy sources could meet up to a third of all energy demands in coming decades. The reports, however, highlight certain limitations to the penetration of renewable energy: the limited land available, high population density and low intensity of natural phenomena—wind or sunlight—all restrict its use. In view of these limitations, they recommend that, as well as promoting renewable energy, Europe should adopt serious energy saving and efficiency measures and achieve stable collaboration with third countries from which they can obtain fossil or renewable energy resources.

Wind power has advanced significantly, especially in countries such as Germany, Spain and Denmark, where clear aid programmes have been established for building wind farms. In Germany, 3.5% of electricity now comes from wind power, and it is envisaged that this figure will rise to 25% by 2025. With 17,000 MW now online, the European Union now accounts for two thirds of the world's total installed wind power. This process has also led to significant industrial development, with the estimated creation of over 100,000 jobs.

Solar energy is being developed in scattered applications — thermal and photovoltaic. These are small in scale but make a clear contribution to creating a new energy culture—one of less consumption and concentration—at the same pace as the development of natural phenomena, with a low impact on the environment and large-scale creation of

employment. The programmes for photovoltaic roofs proposed by some countries, such as Germany, are a stimulus to progress in these solutions, particularly in countries in Southern Europe, where there has also been significant development of solar heat energy in Greece. Further technological research will be required if the solar solution is to have a significant impact on energy figures, but it could be a source of dialogue and collaboration with other geographical areas, especially North Africa.

Biomass has long been a traditional source of energy in rural areas, and today it is being developed in industrial mechanisms which seek efficiency and low environmental impact. The development of new technologies for obtaining liquid bio-fuels is clearly necessary in order to extend renewable energy to the largest of all energy consuming sectors — transport. The Commission's target of achieving 5% of automobile supply will mean extending biomass energy undertakings already in place in some EU countries (Austria, Denmark and Finland, for example) to others, with an appropriate social and environmental commitment to the areas where they are located.

Energy saving and efficiency. In the 1980s and early 1990s, energy intensity fell throughout Europe. Thereafter, the culture of efficient energy use lost ground as deregulation spread. Energy intensity rates have grown in recent years. It is estimated that it would be possible to reduce present energy consumption by somewhat over a quarter without reducing living standards, provided saving and efficient energy use are fostered among individual consumers and other groups — industrial or services-related. Countries such as Germany have developed energy efficiency and saving programmes in industries and buildings, setting ambitious targets for reducing emissions (two million tonnes) and creating employment (200,000 new jobs).

Energy deregulation. Deregulation policies have advanced considerable in EU member states, particularly in terms of natural gas and electricity networks. Concerns about security of supply have made some sectors more cautious in applying these mechanisms, and their fears have been heightened by cases in which countries or companies at the forefront of the deregulation culture have run into serious problems (e.g. California). The European energy market, particularly in the field of gas and electricity, cannot be opened up at the cost of creating problems in security of supply or of not advancing towards long-term solutions to tackle significant and far-reaching problems, such as climate change, which require public initiative and significant regulation. The agreement of the Barcelona Council meeting continues along the path to deregulation, though categorising electricity as a public service.

CONSEQUENCES OF CLIMATE CHANGE

Much of the future of European energy policy is conditioned by the need to act to combat climate change. What are its effects? What are the institutional, international and European policies? According to the Third IPCC Report (2001) the effects of a change in climate resulting from human-derived emissions of greenhouse gases might include:

1. A rise in sea level and flooding of coastal areas, which are home to the largest percentage of the world's population and its production activities, requiring a world-wide "exodus" of unprecedented proportions. Pacific islands, large rice-growing areas (China, Bangladesh, India...) and coastal beaches would be most seriously affected.

2. Extension of "tropical" diseases, such as malaria, or dengue fever to countries with temperate climates.

3. Disappearance of species of flora and fauna and large vegetation formations. A rapid increase in temperatures will not allow these species to adapt or "migrate" towards areas with more favourable conditions.

4. Global change in climate and rain systems with effects at local level. In some areas—including the Mediterranean region—there may be a reduction in precipitation, leading to drought and desertification; in others, rainfall will increase, resulting in floods.

5. Possible significant variations in the route of the ocean currents affecting their climatic area of influence (e.g. the Gulf Stream on Europe) and marine flora and fauna, and thus fish stocks.

In Europe the first areas affected would be the Arctic and the Mediterranean.

All these consequences will also have devastating effects for employment—throughout the world, where millions of displacements caused by climate change would also lead to the loss of millions of jobs—and in Europe too. This is not easy to quantify, but it is possible to identify the countries and industries most at risk. In Europe, the industries most affected would be agriculture and tourism.

EMPLOYMENT

If no changes are made to tackle climate change, then a large number of jobs will be lost. But what effects will the measures adopted to reduce emissions have on employment?

The OECD has analysed various studies by European institutions, governments and special interest groups, regarding the economic cost and the impact on employment of policies oriented towards reducing climate change on employment, and concludes that the economic cost would be about 1% or less of GDP, with a 0.2% relocation of the total work force by 2010. They consider that the estimated impact could be reduced by the flexibility mechanisms.

There will be a positive impact on some specific countries and industries (energy efficiency, demand management, renewable energy, building materials, etc.) while others will be negatively affected (fossil fuel based power generation, chemical industries, high energy-consuming industries). Further analysis needs to be made of the position of the latter groups in order to obtain information that will allow effective measures to be prepared for a fair transition, since even the use of revenue from coal taxes to reduce the tax burden on labour will not avoid severe consequences in certain industries.

Despite the partial conclusions of texts on the subject, the policies for reducing emissions of greenhouse gases foster the development of new job opportunities, in industries such as energy efficiency, renewable energy, combustion control and instrumentation and building materials.

In the European case, most studies conclude that the measures to tackle climate change will have positive effects on employment. The European Commission's White Paper estimates that by 2010, 500,000 net jobs will have been directly created by the renewable energy industry in the EU, with a further 400,000 indirect jobs.

One of the most interesting and thorough studies carried out has been in Germany. It takes a broad timescale and sets out, industry by industry, forecasts for job losses and gains resulting from a reduction in emissions. The report concludes that policies to tackle climate change are beneficial for employment.

EMPLOYMENT LEVELS AND CLIMATE CHANGE IN GERMANY IN A SCENARIO OF 40% REDUCTION IN EMISSIONS			
Industries	**2005**	**2010**	**2020**
Agriculture	-1,580	- 1080	1,280
Mining	- 20,020	- 18,580	- 15,180
Heavy metals	4,320	3,470	4,320
Transport and equipment	490	- 6,120	- 16,640
Electro-technical products	3,270	2,120	3,360
Manufacture of machinery	40,400	34,500	51,230
Other metallurgical products	3,500	3,690	6,120
Food, beverages and tobacco	- 2,340	- 1,710	2,400
Textile, footwear and clothes	- 610	- 400	840
Chemicals	530	- 2,380	- 5,750
Non-metal mineral products	5,790	5,540	8,160
Wood	2,160	2,290	4,850
Paper	750	420	1,180
Other manufactures	- 160	- 170	230
Construction	91,700	86,570	106,730
Electricity, gas and water	400	330	670
Transport	20,360	73,410	97,820
Wholesale and retail trade	- 5,940	- 39,560	- 57,540
Restaurants and hotels	- 2,110	- 2,320	- 140
Banking and insurance	- 2,360	- 8,110	- 12,100
Public Administration	- 3,560	- 8,110	- 10,880
Other services	20,310	9,880	23,070
Total	**155,300**	**132,860**	**194,030**

Principal conclusions of a study for the German Environment Ministry, conducted by Dr. Janina Scheelhaase. Prognos Ag, Cologne. Presented at the BIAC-TUAC meeting in Paris on 12 October 2001.

THE KYOTO PROTOCOL

The scientific community (IPCC) considers that a reduction of over 50% in world emission levels will be required over the next few decades if abrupt climate change is to be averted.

In 1992, on the occasion of the Rio de Janeiro Summit , the nations of the world signed the United Nations Framework Convention on Climate Change (UNFCCC). This led to the Kyoto Protocol (1997) which committed industrialised countries to a 5.2% reduction in emissions by 2008-2012 as compared to the base year (1990 for CO2, NOx and CH4; 1995 for HFCs, PFCs and SF6). The commitments of the different countries are shown in the table below:

• Australia	+ 8%	• Lithuania	- 8%
• Canada	- 6%	• Norway	+ 1%
• Estonia	- 8%	• Russia	0%
• Iceland	+ 10%	• Switzerland	- 8%
• Liechtenstein	- 8%	• Bulgaria	- 8%
• New Zealand	0%	• Czech Republic	- 8%
• Rumania	- 8%	• Hungary	- 6%
• Slovenia	- 8%	• Latvia	- 8%
• USA	- 7%	• Monaco	- 8%
• Austria	- 8%	• Poland	- 6%
• Croatia	- 5%	• Slovakia	- 8%
• **EU**	**- 8%**	• Ukraine	0%
• Japan	- 6%		

The United States has declined to ratify the Protocol. But the European Union, Japan, Russia and the other industrialised countries (listed in Annex 1 of the Protocol) have committed themselves to ratifying it, and it could come into force before Rio+10.

The most controversial issues during negotiations on application of the Protocol were:

- The rules with which the flexibility mechanisms will operate: Emissions Trading, Joint Application (between Annex 1 countries in both cases) and Mechanism for Clean Development (co-operation between Annex 1 countries and others).

- How the establishment of "carbon sinks " in national inventories is to be accredited.

- What funds and how much will be devoted to helping developing countries to mitigate the effects of climate change

- What procedures will be used to ensure compliance with commitments and penalties for non-compliance.

Annex 1 countries must report on their carbon-sink activities in order to be able to participate in the mechanisms and their inventories may be adjusted at the end of the period if it is considered that their reports were inaccurate. They are also required to report on work to protect biodiversity within the framework of the carbon sinks.

Countries which do not meet their commitments will carry their debt over to the following period with an 30% increase; they will not be able to sell certificates and must establish an action plan for compliance.

THE EUROPEAN UNION AND CLIMATE CHANGE

The EU has been at the forefront of the Kyoto process. It has committed to a reduction in emissions of 8%, re-distributed internally in the so-called "European bubble" as follows. According to a report from the European Environment Agency, the present position of compliance of each EU member state is as follows:

European emissions of greenhouse gases 1990-2000 with trends and Kyoto Protocol targets 2008-2012

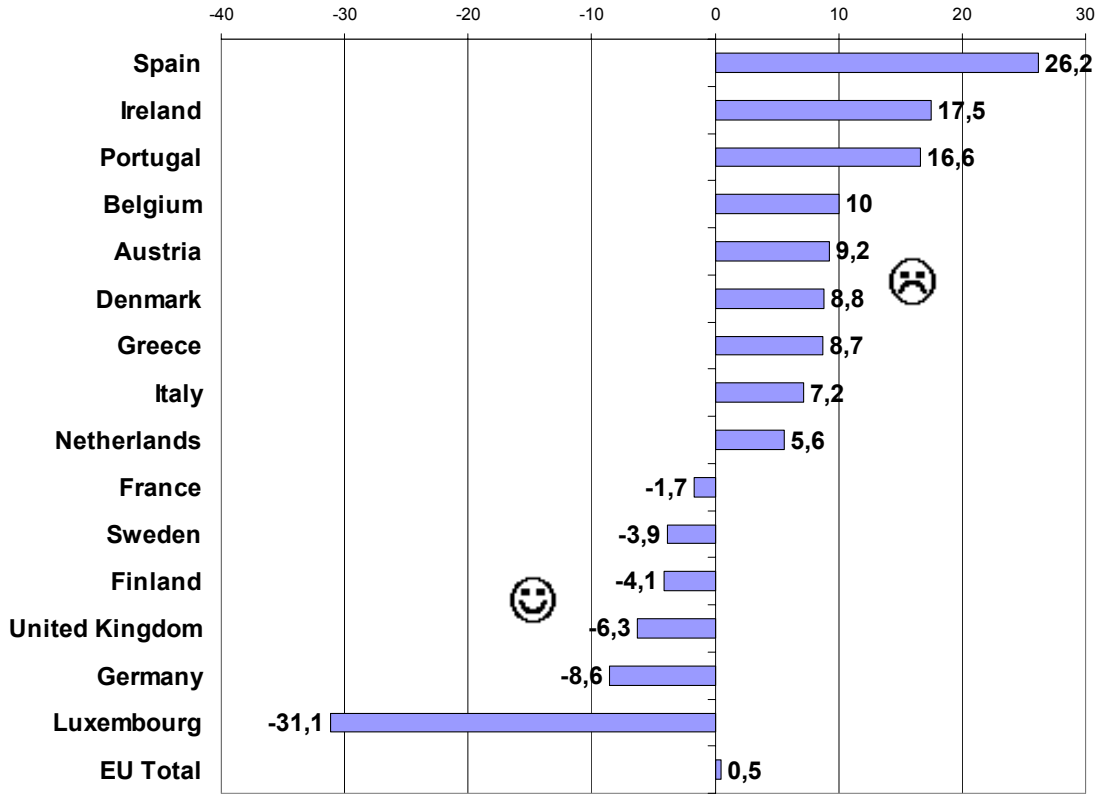
Member states	Change 1999-2000 (%)	Change 1990-2000 (%)	Kyoto Protocol targets and the "European bubble" 2008-12	Distance-to-target indicator (DTI)	Assessment of progress in 2000
Austria	0.0%	2.7%	-13.0%	9.2	☹
Belgium	0.5%	6.3%	-7.5%	10.0	☹
Denmark	-6.0%	-1.7% (-9.8%)	-21.0%	8.8 (0.7)	☹ (☹)
Finland	-2.9%	-4.1%	0.0%	-4.1	☺
France	-1.1%	-1.7%	0.0%	-1.7	☺
Germany	-0.2%	-19.1%	-21.0	-8.6	☺
Greece	4.8%	21.2%	25.0%	8.7	☹
Ireland	1.5%	24.0%	13.0%	17.5	☹
Italy	0.7%	3.9%	-6.5%	7.2	☹
Luxembourg	-0.6%	-45.1%	-28.0%	-31.1	☺
Netherlands	-0.4%	2.6%	-6.0%	5.6	☹
Portugal	-1.1%	30.1%	27.0%	16.6	☹
Spain	4.1%	33.7%	15.0%	26.2	☹
Sweden	-1.6%	-1.9%	4.0%	-3.9	☺
United Kingdom	0.4%	-12.6%	-12.5%	-6.3	☺
EU Total	0.3%	-3.5%	-8.0%	0.5	☹

[1)]For the fluorinated gases some Member States have selected a base year other than 1990, as allowed for under the Protocol.
[2)]For Denmark, data that reflect adjustments for electricity trade (import and export) in 1990 are given in brackets. This methodology is used by Denmark to monitor progress towards its national target under the EU "burden sharing" agreement. For the EU emissions total non-adjusted Danish data have been used.

[3)]The EEA's evaluation of progress to 2000 awards "smileys" according to the distance-to-target indicator in 2000. The distance-to-target indicator (DTI) is a measure of the deviation of actual greenhouse gas emissions in 2000 from the linear target path between 1990 and the Kyoto Protocol target for 2008-2012, assuming that only domestic measures will be used. The following rating system is used:

☺: Positive contribution to EU trend: the negative distance-to-target indicator means that the Member State is below its linear target path

☹: Negative contribution to EU trend: the positive distance-to-target indicator means that the Member State is above its linear target path



EU policies on climate change are geared to complying with Kyoto commitments and seeking to ensure that other countries also meet the targets, as an indispensable measure for a greater international effort after the effect of limiting climate change. The Commission proposes various actions in this area. These include:

- The progressive elimination of subsidies for production and consumption of fossil fuels by 2010. Adoption of indirect measures to contribute to developing alternative energy sources. Analysis of the advisability of creating coal reserves and keeping a minimum level of subsidised production for reasons of security of supply, if this requires maintaining access to community coal resources. Proposal by the Commission in 2001, for adoption by the Council before expiry of the CECA Treaty in July 2002. Take into account the specific situation of certain candidate countries in the Membership Treaties.

- A new framework for energy taxation. Adoption of the Directive on taxation of energy products by 2002. In an additional period of two years, the Commission will propose

more ambitious environmental goals in the area of energy taxation, with the ultimate goal of total internalisation of external costs, and the indexing of minimum levels of special taxes, at least in accordance with the inflation rate.

- Setting-up of a proposal to create a European system of negotiable CO2 licenses by 2005. The Commission predicts that the Directive on emission exchange will start to be applied in 2005 for large industrial and energy-producing facilities, in co-ordination with the IPPC directive. Extension to other industries will be analysed in 2004.

- Fostering of alternative fuels, should account for at least 7% of fuel consumption by cars and lorries in 2010, and at least 20% in 2020.

- Clear action to reduce energy demand, e.g. by means of minimum standards and stricter requirements on labelling for buildings and electrical apparatuses in order to improve energy effectiveness.

- Greater support to research, development and dissemination of technologies for clean and renewable energy sources; safer nuclear energy, especially in terms of the management of nuclear waste.

NOTES FOR THE DEBATE ON THE TRADE UNION POSITION TO COMMUNITY PROPOSALS

In general, the European Commission's proposals to counter climate change are well oriented and deserve support from trade unions. Nonetheless, certain aspects should be highlighted on which the trade union debate should focus. However, the policy of European energy deregulation, which includes privatisation and deregulation, has some more questionable aspects, which also require debate and a trade union stance.

- Taxation:

In recent years there have been few advances at EU Level on matters of energy taxation. However an ever greater number of member states have decided to extend the area of energy taxes to include other energy uses, such as electricity.

At community level a tax fragmentation can be seen in energy matters, with only special taxes on hydrocarbons and VAT regulated by a community system. There are differences in taxation on energy products depending on the different members states (taxes on CO2, SO2, nuclear energy, aid to coal; special taxes on hydrocarbons, etc.). The great differences between the different systems of taxing the energy industry in the EU hinders the prevention and reduction of environmental impact, and the promotion of more efficient means of transport.

What is needed is tax harmonisation throughout the EU, given that the prices must reflect the environmental and social costs, to improve competition between different energy products and establish incentives that stimulate demand for more environmentally-sound products. In all cases, energy taxation policies must seek to prevent adverse social effects for the poorest and most underprivileged sectors of society, and to guarantee their right of access to energy. They must also take account of any effects on employment in very

energy intensive manufacturing industries. Control of measures of social support to prevent adverse social effects must include the participation of trade unions and consumers at national and European level.

It would be necessary to initiate an ambitious environmental tax reform in the context of the European Strategy on Sustainable Development, reinforcing the Cardiff initiative, whose purpose is to incorporate social and environmental indicators into decisions on economic policy. This tax reform on energy matters must not affect overall tax pressure, with corresponding reductions in other tax burdens such as those levied on labour. Tax revenue must be spent on environmental protection and social protection, to guarantee contributory benefits which might be affected by a reduction in labour-related tax burdens. In this sense, energy taxation will not entirely cease to be finalistic, and in accordance with the twin dividend concept, it will cover social and environmental objectives, favouring the creation of employment and contributing to environmental protection.

- Energy saving and efficient use of energy.

It is possible to reduce current energy consumption by over a quarter without reducing living standards. This must be a primary objective of any community energy policy. Development and dissemination of energy efficient equipment (automobiles, domestic appliances, computer equipment, cooling systems, etc.) could give European industry a positive boost and make it more competitive in the medium and long term future. It will also have a very positive impact on employment.

Product labelling, regular review of the energy efficiency of services and buildings—public and private—together with energy audits, must be extended to industry with a view to bringing about modifications in equipment, processes and industrial products.

Information, awareness and social participation are required, targeted towards a positive view of more energy-efficient products and services. Participation by employees and their representatives in designing the policies and in the companies, is essential for the success of such policies.

These statutory, economic, fiscal and participatory measures need to be accompanied by specific plans, with concrete aims and sufficient economic provisions.

- Renewable Energy:

It is inevitable that there will be a significant development in renewable energy resources over the coming century. Their reduced impact on the environment; the fact that they are produced from inexhaustible resources; the complementary nature of source areas; the fact that they are evenly distributed around the world; their decentralised use and their capacity to generate new jobs are undeniable advantages for rational and diversified energy production on a world scale. Nonetheless, even if their potential for development remains very high, renewable energy cannot fully replace other sources of energy production in the medium term future.

Renewable energy is penetrating slowly into the European energy system. Regrettably, if current EU trends for production using renewable energy continue, the proposed target

will not be met (12% of total energy production based on renewable sources by 2010), and it will therefore be necessary to establish additional measures.

Wind power has greater capacity for bringing renewable electricity online, although it is not available in certain seasons of the year, due to the absence or lack of strength of the wind. The grid and its controllers must accept this fact and have the system and the large power utilities resolve the related technical and economic questions, so that wind power can progressively be slotted into the power system on a large scale, creating the conditions under which it can be uploaded to the grid in a balanced fashion, supplemented with other energy sources. Regulation or deregulation of the market must be adapted to the pace of recovery of wind power. Development of the European wind power industry has created competitive companies and jobs; on-land wind farms are being successfully built, and in the future offshore facilities will open up a broader line of development. The installation of wind farms should be regulated in each country taking into account zoning arrangements and land use management. The European Union must work to extend this option to third countries — in terms both of power generating facilities (and very likely H2 production) and at the same time the creation of the necessary manufacturing industries and installers. This would be positive for everyone in economic, social and environmental terms.

In the area of solar energy there needs to be an extension of scattered facilities, which contribute so much to creating a new culture of "soft" energy, but in addition new technologies need to be developed that will make it easier to install power plants. Training of workers in the installation and maintenance of solar energy facilities is one of the key factors for its potential development.

Biomass offers great opportunities for job creation in power generation and the obtention of liquid and solid fuels, as ALTENER reports show, although it requires an in-depth preliminary environmental analysis, particularly in the case of medium to large sized facilities which might have an impact on ecosystems. It therefore needs to be regulated in each country, taking into account local land-use management. Similarly, the EU must be careful to minimise possible environmental damage when importing liquid bio-fuels or raw materials for creating them from third countries.

Public information and participation including the trade unions in the process of introducing renewable energy will facilitate wider extension, favouring use of renewable energy and overcoming the unfavourable public opinion faced by some facilities. Participation by trade unions will also favour more widespread training of workers in the manufacture, installation and maintenance of equipment.

- Negotiable Licenses:

Licenses that allow companies to obtain compensation if their effective emissions are below the set levels for their industry, must be organised in a market overseen by national and EU authorities, to avoid distorted interpretations of the principle of "the polluter pays". It must be a transparent process with clear procedures. Companies must not be allowed to emit pollutants freely in exchange for money, without the necessary effort to reduce the emissions. Participation by employees' representatives in the process must be ensured.

- Mechanism of Clean Development:

It must be ensured that economic and technological resources are effectively transferred towards the development of renewable energy and good energy practises in third countries.

Monitoring of this mechanism must include participation from the social partners in the EU and also in the countries receiving these applications. Employees' representatives in the companies involved—in the EU and third countries—must be informed and consulted on the process of adopting and implementing MDL-linked initiatives.

- Use of Coal:

Reduction in the use of coal is in line with the criteria of the fight against climate change. Nonetheless, it must also take into account aspects of security of the energy supply and ensure a fair transition for the employees and mining areas affected. It seems logical to maintain a certain potential of coal-fired power generation for a number of years, even if usage—in terms of hours per year—is progressively reduced. However security of supply must be taken into account and mining activity reduced or shut down gradually.

- Nuclear Power:

On a global scale, the oft-repeated idea of resorting to nuclear energy to combat the greenhouse effect cannot be squared with the fact that for political, economic and technical considerations prevent this technology from being developed on a large scale. Even the most favourable energy scenarios for nuclear power indicate that it will not account for over 10% of world energy production in 2050 - insufficient to meet the challenge of climate change. Excluded from the Kyoto Protocol and the mechanisms of flexibility, the strong social opposition to the development of nuclear energy is essentially related to the risk of accidents and the stockpiling and elimination of long-life radioactive waste.

Nuclear energy in Europe continues to decline as an energy alternative. Indeed the parliaments and governments of a number of major European countries have decided to progressively close down their nuclear power facilities. In addition, the electoral platforms of some opposition socialist parties also include the gradual phasing-out of nuclear power (as is the case in Spain), and in the future this could increase the number of member states choosing to unilaterally abandon the nuclear option. As a result of this process, it seems advisable to adopt a single-direction common European policy, within a pattern of transition to another energy structure model which is more sustainable and more environmentally-sound, in a way which is satisfactory for all countries, in energy, environmental and social terms. In any case, these processes are slow, and involve several years of nuclear use, until the end of the forecast life of the power stations, whose closure will subsequently require many years of work and provision of services. This should mean that there are no adverse social effects, especially on employment. In any case, employment should be dealt with specifically, with the necessary mechanisms for a fair transition..

- Transport Policies:

The primary factors of external impact of the system are the accident rate, and atmospheric emissions — which according to EU data are responsible for 28% of the CO2 emissions,

of which 84% derives from road transport. It is a forecast that by 2050 road transport will account for 50% of total CO2 emissions.

Moves should be taken to stabilise mobility and encourage intermodal transport use, reducing the disproportionate importance of road transport. Greater backing needs to be given to rail transport over road transport. Indeed, it is worth remembering that the European Union has a high ratio of goods transport by road than the United States.

The proposals for integrating regional and urban planning, reducing mobility requirements and improving public transport must be supplemented with other measures to reduce the incursion of the automobile into the city and to favour public transport for commuting purposes.

Greater vehicle efficiency and the use of bio-fuels must form part of any transport policy designed to reduce emission rates.

- Deregulation of Energy Markets

The profound change required in the energy model to combat climate change and favour overall sustainability, also raises doubts about the advisability of introducing in-depth deregulation in the energy system. It is not easy to see how deregulation can contribute to encouraging energy saving and efficient energy use or to developing far-reaching technological research. Indeed, in saving terms, deregulation policies have fostered a lack of demand management and an increase in supply, thus removing incentives to saving. In terms of energy-related R&D, there has been a clear reversal in recent years, paralleling the deregulation processes.

Open pricing mechanisms do not inspire confidence among small and medium investors developing renewable energy. In addition, the significant penetration of renewable energy the power grid have to be accompanied by technical and economic solutions which keep power facilities operating to be used only when meteorological conditions require — such as at times of low wind intensity. These economic considerations are not at present covered in deregulation schemes.

Deregulation of the power market se been accompanied by the availability of natural gas, which considerably reduces the specific investment in new generation, facilitating the removal of the recognised investment concept, closely linked to the previous regulation structure. The replacement of other fossil fuels by natural gas is a positive development, given the reduction in specific CO2 emissions; but it is only transitory. Uncontrolled growth of gas-fired power facilities, an increase in demand for gas for other uses and possible restrictions on supply at source, require a certain degree of caution.

Energy generation and distribution must be viewed as a public service, meeting scheduled targets, properly regulated at a European scale, and this requires important corrections to the privatisation and deregulation process, with greater weight given to political decisions and social participation.

CHANGE IN ENERGY MODEL

Energy sustainability and the problems derived from climate change require not only compliance with the Kyoto agreements in this decade. In the long term, profound changes are required in the energy model and these must be implemented in the next few decades. The guidelines in this regard must be analysed and agreed in consensus with the social partners, since they will affect the way we all live and will influence the quantity and quality of employment..

Energy needs and demands: We need to advance towards a model of demand-side energy management, which covers the real needs for goods and services, to achieve balanced and sustainable social development, with less use of resources and lower environmental impact. This will require more efficient equipment, processes, products and services and a new transport model, based on intermodal use for passenger and freight traffic alike, and the use of bio-fuels.

R&D and new technologies. For the introduction of more efficient equipment and processes in industries and services . For the development and introduction, for example, of fuel cells in vehicles and for other energy uses. For the extension of renewable energy to power generation and to the supply of new fuels with a high hydrogen content; probably as a means of directly producing H2 fuel.
Hydrogen would appear to be set to be the clean option for energy supply, with no affect on climate change. The possibility of obtaining hydrogen from natural gas has already been raised, but in the future it will be necessary to obtain it through renewable energy, either by using electricity or by solar disassociation of water. In any case the possibilities of Europe's becoming self-sufficient in this fuel are limited, and it is therefore necessary to consider frameworks of collaboration with other continents.

Collaboration with third countries, co-operation and development. The EU is dependent for its energy on external sources and will continue to be so in the future. The change in the model leads to changes in energy supply. Natural gas must be considered as a "transition fuel", en route to other models with less impact than fossil fuels. Renewable energy must progressively become the leading provider of energy. It is already proposed that worldwide it could account for between 60 and 80% by the end of the century, although complementary structures will also be required. The EU's collaboration with other countries to cover its energy deficit must also be guided by the change in model. The new energy policy must be a key part of European policy on development co-operation.